Mst:Evaluting Effective Framework for Provide Efficient Transcode Services

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Abstract: The rapidly increasing power of personal mobile devices (smartphones, tablets, etc.) is providing much richer contents and social interactions to users on the move. This trend however is throttled by the limited battery lifetime of mobile devices and unstable wireless connectivity, making the highest possible quality of service experienced by mobile users not feasible. The recent cloud computing technology, with its rich resources to compensate for the limitations of mobile devices and connections, can potentially provide an ideal platform to support the desired mobile services. Tough challenges arise on how to effectively exploit cloud resources to facilitate mobile services, especially those with stringent interaction delay requirements. In this paper, we propose the design of a Cloud-based, novel Mobile sOcial tV system (CloudMoV). The system effectively utilizes both PaaS (Platform-as-a-Service) and IaaS (Infrastructure-asa-Service) cloud services to offer the living-room experience of video watching to a group of disparate mobile users who can interact socially while sharing the video. To guarantee good streaming quality as experienced by the mobile users with timevarying wireless connectivity, we employ a surrogate for each user in the IaaS cloud for video downloading and social exchanges on behalf of the user. The surrogate performs efficient stream transcoding that matches the current connectivity quality of the mobile user. Given the battery life as a key performance bottleneck, we advocate the use of burst transmission from the surrogates to the mobile users, and carefully decide the burst size which can lead to high energy efficiency and streaming quality. Social interactions among the users, in terms of spontaneous textual exchanges, are effectively achieved by efficient designs of data storage with BigTable and dynamic handling of large volumes of concurrent messages in a typical PaaS cloud. These various designs for flexible transcoding capabilities, battery efficiency of mobile devices and spontaneous social interactivity together provide an ideal platform for mobile social TV services. We have implemented Cloud MoV on Amazon EC2 and Google App Engine and verified its superior performance based on real world experiments.

1. Introduction

In this paper, we describe the design of a novel mobile social TV system, CloudMoV,which can effectively utilize the cloud computing paradigm to offer a living-room experience of video watching to disparate mobile users with spontaneous social interactions. In CloudMoV, mobile users can import a live or on-demand video to watch from any video streaming site, invite their friends to watch the video concurrently, and chat with their friends while enjoying the video. It therefore blends viewing experience and social awareness among friends on the go. As opposed to traditional TV watching, mobile social TV is well suited to today's life style, where family and friends may be separated geographically but hope to share a co-viewing experience.

2. Related Work

A number of mobile TV systems have sprung up in recent years, driven by both hardware and software advances in mobile devices. Some early systems [1][2] bring the "livingroom" experience to small screens on the move. But they focus more on barrier clearance in order to realize the convergence of the television network and the mobile network, than exploring the demand of "social" interactions among mobile users. There is another trend in which efforts are dedicated to extending social elements to television systems [3] [4][5]. Coppens et al. [3] try to add rich social interactions to TV but their design is limited to traditional

broadcast program channels. Oehllberg et al. [4] conduct a series of experiments on human social activities while watching different kinds of programs. Though inspiring, these designs are not that suitable for being applied directly in a mobile environment. Schatz et al. [6][7] have designed a mobile social TV system, which is customized for DVBH networks and Symbian devices as opposed to a wider audience. Compared to these prior work and systems, we target at a design for a generic, portable mobile social TV framework, featuring co-viewing experiences among friends over geographical separations through mobile devices. Our framework is open to all Internet-based video programs, either live or on-demand, and supports a wide range of devices with HTML5 compatible browsers installed, without any other mandatory component on the devices. Although our prototype is implemented on only two public clouds, i.e., Amazon EC2 and Google App Engine, it can be easily ported to other cloud systems as long as the targeted cloud platforms conform to the unified standard.

3. Problem Statement

3.1: Existing System

A number of mobile TV systems have sprung up in recent years, driven by both hardware and software advances in mobile devices. Some early systems bring the living room experience to small screens on the move. But they focus more on barrier clearance in order to realize the convergence of the television network and the mobile network, than exploring the demand of "social" interactions among mobile users.

Disadvantages

Although many mobile social or media applications have emerged, truly killer ones gaining mass acceptance are still impeded by the limitations of the current mobile and wireless technologies.

- ✓ Low Battery life.
- ✓ Lack of picture quality.
- ✓ Limited band width.

3.2: Proposed System

We propose the design of a Cloud-based, novel Mobile social TV system. The system effectively utilizes both PaaS (Platform-as-a-Service) and IaaS (Infrastructure-asa- Service) cloud services to offer the living-room experience of video watching to a group of disparate mobile users who can interact socially while sharing the video. To guarantee good streaming quality as experienced by the mobile users with time varying wireless connectivity, we employ a surrogate for each user in the IaaS cloud for video downloading and social exchanges on behalf of the user.

Advantages

Encoding Flexibility

Different mobile devices have differently sized displays and various codec's.

- ✓ Traditional solutions would adopt a few encoding formats ahead of the release of a video program.
- ✓ CloudMoV customizes the streams for different devices at real time, by offloading the transcoding tasks to an IaaS cloud.

4. System Architecture

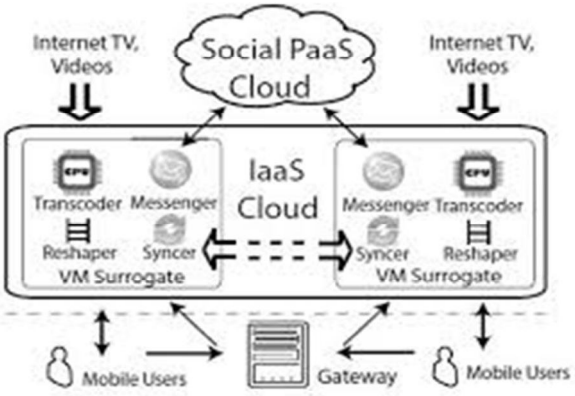


Fig. 1. The architecture of CloudMoV.

5. Modules

Module Description

1. Transcoder

It resides in each surrogate, and is responsible for dynamically deciding how to encode the video stream from the video source in the appropriate format, dimension, and bit rate. Before delivery to the user, the video stream is further encapsulated into a proper transport stream. Each video is exported as MPEG-2 transport streams which is the de facto standard nowadays to deliver digital video and audio streams over lossy mediu.

2. Social Cloud

Social network is a dynamic virtual organization with inherent trust relationships between friends. This dynamic virtual organization can be created since these social networks reflect real world relationships. It allows users to interact, form connections and share information with one another. This trust can be used as a foundation for information, hardware and services sharing in a Social Cloud.

3. Messenger

It is the client side of the social cloud, residing in each surrogate in the IaaS cloud. The Messenger periodically queries the social cloud for the social data on behalf of the mobile user and pre-processes the data into a light-weighted format at a more lower frequency. The plain text files are asynchronously delivered from the surrogate to the user in a traffic-friendly manner. In the reverse direction, the messenger disseminates this user's messages to other users via the data store of the social cloud.

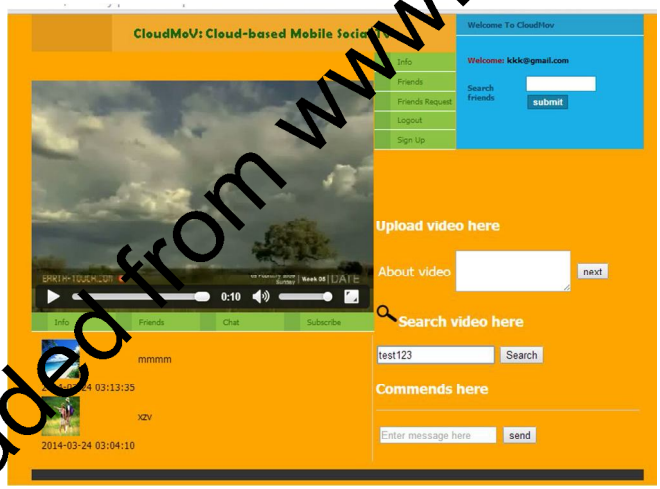
4. Gateway

The gateway provides authentication services for users to log in to the CloudMoV system and stores user's credentials in a permanent table of a MySQL database it has installed. It also stores information of the pool of currently available VMs in the IaaS cloud in another in-memory table. The in-memory table is used to guarantee small query latencies, since the VM pool is updated frequently as the gateway reserves and destroys VM instances according to the current workload. The gateway also stores each user's friend list in a plain text file (in XML formats), which is immediately uploaded to the surrogate after it is assigned to the user.

5. Subscribe

In this module user can download the video. Subscribe module download video in high speed and clear video streaming. Authorized user every one download and watch those videos.

6. Experimental Results



7. Future Enhancement

In the current prototype, we do not enable sharing of encoded streams (in the same format/bit rate) among surrogates of different users. In our future work, such sharing can be enabled and carried out in a peer-to-peer fashion, e.g., the surrogate of a newly joined user may fetch the transcoded streams directly from other surrogates, if they are encoded in the format/bit rate that the new user wants.

8. Conclusion

We conclude results prove the superior performance of CloudMoV, in terms of transcoding efficiency, timely social interaction, and scalability. In CloudMoV, mobile users can import a live or on-demand video to watch from any video streaming site, invite their friends to watch the video concurrently, and chat with their friends while enjoying the video.

9. References

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